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# Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Florida)

# FLORIDA POMPANO

Fish and Wildlife Service
U.S. Department of the Interior

Coastal Ecology Group
Waterways Experiment Station
U.S. Army Corps of Engineers

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# Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Florida)

## FLORIDA POMPANO

by

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## PREFACE

This species profile is one of a series on coastal aquatic organisms, principally fish, of sport, commercial, or ecological importance. The profiles are designed to provide coastal managers, engineers, and biologists with a brief comprehensive sketch of the biological characteristics and environmental requirements of the species and to describe how populations of the species may be expected to react to environmental changes caused by coastal development. Each profile has sections on taxonomy, life history, ecological role, environmental requirements, and economic importance, if applicable. A three-ring binder is used for this series so that new profiles can be added as they are prepared. This project is jointly planned and financed by the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service.

Suggestions or questions regarding this report should be directed to one of the following addresses.

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Vicksburg, MS 39180

## CONVERSION TABLE

### Metric to U.S. Customary

| Multiply | By | To Obtain |
|---|---|---|
| millimeters (mm) | 0.03937 | inches |
| centimeters (cm) | 0.3937 | inches |
| meters (m) | 3.281 | feet |
| kilometers (km) | 0.6214 | miles |
| square meters ($m^2$) | 10.76 | square feet |
| square kilometers ($km^2$) | 0.3861 | square miles |
| hectares (ha) | 2.471 | acres |
| liters (l) | 0.2642 | gallons |
| cubic meters ($m^3$) | 35.31 | cubic feet |
| cubic meters | 0.0008110 | acre-feet |
| milligrams (mg) | 0.00003527 | ounces |
| grams (g) | 0.03527 | ounces |
| kilograms (kg) | 2.205 | pounds |
| metric tons (t) | 2205.0 | pounds |
| metric tons | 1.102 | short tons |
| kilocalories (kcal) | 3.968 | British thermal units |
| Celsius degrees | 1.8(°C) + 32 | Fahrenheit degrees |

### U.S. Customary to Metric

| | | |
|---|---|---|
| inches | 25.40 | millimeters |
| inches | 2.54 | centimeters |
| feet (ft) | 0.3048 | meters |
| fathoms | 1.829 | meters |
| miles (mi) | 1.609 | kilometers |
| nautical miles (nmi) | 1.852 | kilometers |
| square feet ($ft^2$) | 0.0929 | square meters |
| acres | 0.4047 | hectares |
| square miles ($mi^2$) | 2.590 | square kilometers |
| gallons (gal) | 3.785 | liters |
| cubic feet ($ft^3$) | 0.02831 | cubic meters |
| acre-feet | 1233.0 | cubic meters |
| ounces (oz) | 28.35 | grams |
| pounds (lb) | 0.4536 | kilograms |
| short tons (ton) | 0.9072 | metric tons |
| British thermal units (Btu) | 0.2520 | kilocalories |
| Fahrenheit degrees | 0.5556(°F - 32) | Celsius degrees |

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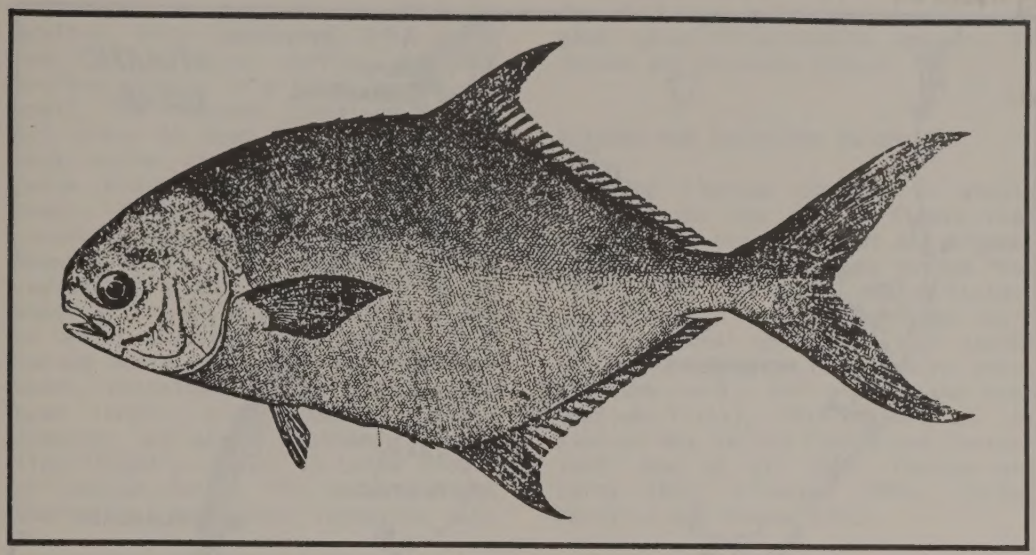

Figure 1. Florida pompano (from Hildebrand and Schroeder 1928).

# FLORIDA POMPANO

## NOMENCLATURE/TAXONOMY/RANGE

Scientific name ... Trachinotus carolinus (Linnaeus)
Preferred common name ..... Florida pompano (Figure 1)
Other common names ... Pompano, common pompano, Atlantic pompano, "sunfish," Pompaneau sole (Fr.), Pámpano amarillo (Sp.)
Class ..... Osteichthyes
Order ..... Perciformes
Family ..... Carangidae

Geographic Range: Coastal waters from Cape Cod, Massachusetts, to southeastern Brazil. Uncommon north of Chesapeake Bay; especially common along the Florida coast. Widely distributed but uncommon among West Indian islands that have continental-type ecological conditions (e.g., Jamaica and Puerto Rico). Erroneously reported for Bermuda (Berry and Smith-Vaniz 1978). Areas of major fishing catches of Florida pompano in the south Florida region are shown in Figure 2.

## MORPHOLOGY AND IDENTIFICATION AIDS

The following is largely extracted from Berry and Smith-Vaniz (1978). Dorsal fin rays VI + I, 22 to 27 (usually 23 to 25); anal fin rays II + I, 20 to 24 (usually 21 or 22); no teeth on tongue at any size; no enlargement of second to fourth ribs; no dark vertical bars on upper half of body; anterior-most dorsal and anal rays not notably elongated in adults and subadults, not extending posteriorly to base of caudal fin; maximum total length (TL) and weight about 63.5 cm and 7.5 lb; individuals over 4 lb rare (Buckow 1965). The record pompano caught by angling in Florida weighed 10 lb, 5 oz (Florida Conservation News 1976 Vol. 10, p. 12). Body short and deep (depth contained 2.0 to

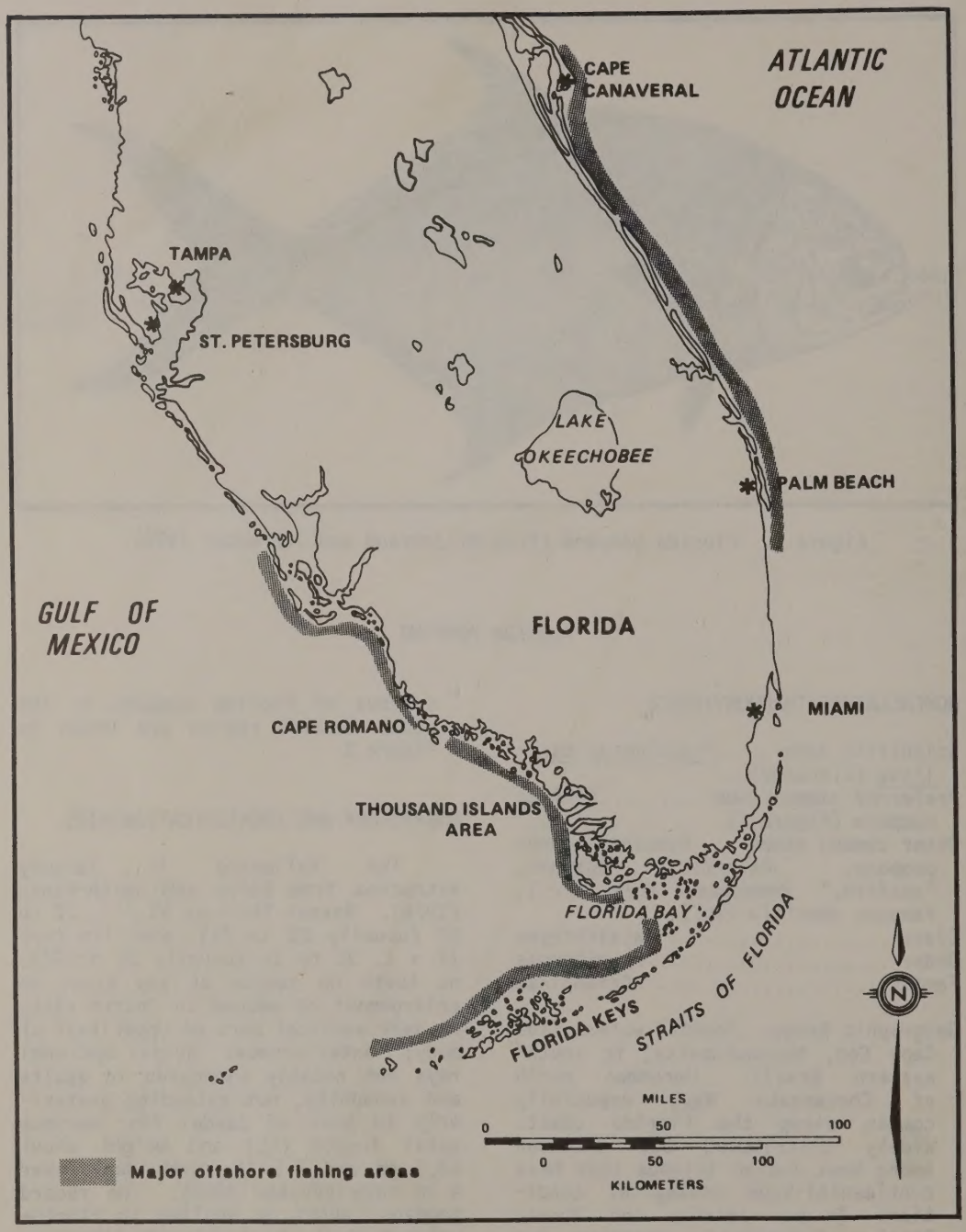


Figure 2. Areas of major fishing catches for Florida pompano in south Florida.

2.8 times in fork length [FL] in adults); body compressed, with upper and lower profiles similar and head profile sloping to a blunt snout; eye small, its diameter contained 3.2 to 5.1 times in head length; upper jaw very narrow at end and extending to below mid-eye; lower jaw included; teeth in jaws small, conical, and recurved, disappearing completely by about 20 cm FL; gill rakers (including rudiments) 5 to 7 on upper limb of outer gill arch, 8 to 14 on lower part of arch; anal-fin base shorter than second dorsal-fin base; pectoral fins short, contained 1.1 to 1.3 times in head length; scales small, cycloid (smooth), and partly embedded; lateral line slightly arched to below middle of second dorsal fin and straight thereafter; no scutes; vertebrae 10 + 14.

The other two species of Trachinotus in the western North Atlantic and Gulf of Mexico regions differ from the Florida pompano as follows: permit (T. falcatus) has fewer dorsal soft rays (17 to 21, usually 18 to 20); fewer anal soft rays (16 to 19, usually 17 or 18); teeth present on tongue in individuals smaller than about 9 cm TL, but disappearing in larger specimens and completely absent in those over 22 cm FL; enlargement of ribs 2-4; juveniles with a bright orange anal fin (vs. lemon yellow in the Florida pompano); maximum size considerably larger, individuals commonly reaching 20-30 lb and occasionally 50 lb. The palometa (T. goodei) has fewer dorsal soft rays (19 or 20); fewer anal soft rays (16 to 18); four distinct narrow bars on upper part of body; and anterior-most dorsal and anal soft rays notably elongated in adults and subadults, extending posteriorly nearly to end of caudal fin.

Color in life: bluish green on back, shading into silvery on sides; stomach area and parts of head sometimes yellowish; fins mostly yellowish, the elevated part of the dorsal dusky; pelvic fins white. A good color illustration appears in Jordan and Evermann (1902).

## REASONS FOR INCLUSION IN SERIES

The Florida pompano is widely esteemed as one of the finest food fishes, and brings one of the highest prices (per pound) of any marine food fish in the continental United States; consequently, it is an important sport and commercial species. It is caught by sport fishermen in inshore areas (in the surf, off piers, and over shallow flats). Mariculture of the species has failed (Berry and Iversen 1967; Moe et al. 1968; Iversen and Berry 1969; Finucane 1970a, 1970b; Marcello and Strawn 1972).

## LIFE HISTORY

Although the Florida pompano ranges southward as far as southern Brazil, virtually all published life history information is based on populations in U.S. coastal waters.

### Spawning

The Florida pompano apparently has a protracted spawning season. Young-of-the-year fish of a wide range of lengths are abundant in the warmer waters of its range, and after early summer along the upper Atlantic coast (Gunter 1945; Fields 1962; Gunter and Hall 1963; Finucane 1969a). The Florida pompano apparently does not spawn north of southern Virginia and the young observed to the north probably migrated there (or were carried passively) from more southerly waters. In Florida and elsewhere in the southern United States, the main spawning months are April through June and September and October (Finucane 1969a).

Spawning of Florida pompano has not been observed and opinions differ

about whether they spawn in inshore or offshore waters. Evidence for offshore spawning is based in part on the appearance of small larvae (3.0 to 4.5 mm long) in plankton tows up to 24 km offshore in Florida waters over the Continental Shelf of the eastern Gulf of Mexico (Finucane 1969a). As further evidence of offshore spawning (Finucane, pers. comm.), ten ripe pompano were captured in spring 1983 near the DeSoto Canyon (the top of which is 54-60 m below the surface) in the northern Gulf of Mexico, and two larvae (7.2 and 11.0 mm long) were taken in plankton tows 98 and 49 km off the coast of South Carolina. One was taken near the surface in the Gulf Stream in water over 100 fathoms (183 m) deep (Fields 1962). Spawning in the Gulf Stream probably accounts for the dispersal of larvae far to the north.

Water temperatures at time of spawning have not been recorded, but few young have been collected at temperatures less than 19 °C (Fields 1962).

Examination of gonads from 17 females taken in Tampa Bay in early April revealed that all contained developing oocytes, but only one (356 mm TL and 576 g) was gravid; it contained about 630,000 eggs (Finucane 1969a). From these data, Finucane (1969b) estimated that an average-sized female would produce 600,000 to 800,000 eggs per year. Moe et al. (1968) reported 425,000 eggs in a sexually mature female 255 mm FL.

## Larval Stage

Florida pompano larvae (Figure 3) spend their first month of life at sea (Fields 1962). By the end of the month, most have moved inshore to the beaches, which are the preferred habitat (nursery grounds) of the young. From hatching until they reach the nursery grounds, they undergo at least a threefold increase in length

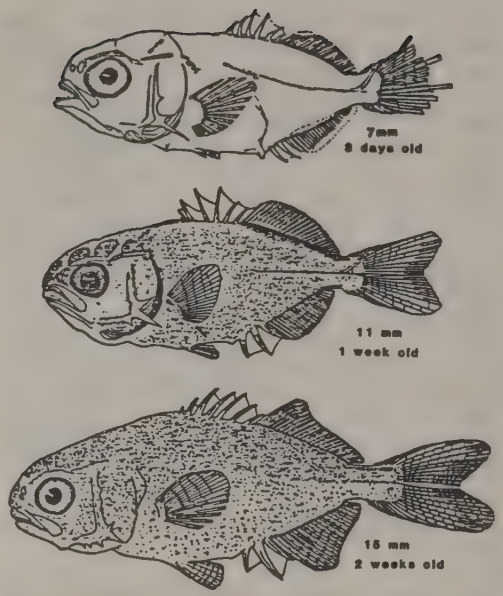


Figure 3. Florida pompano larvae; size given in fork lengths (Fields 1962).

(about 3 to 12 mm standard length [SL] or longer).

## Postlarvae and Juveniles

Juvenile Florida pompano (Figure 3) live primarily in the surf zone along gradually sloping sandy beaches (Fields 1962). For example, in Florida about 100,000 juveniles, 25 to 100 mm TL, were collected with a seine in the surf zone for a mariculture experiment. In Georgia, larvae from the first spawners move to the beaches when they are between 10 to 30 mm SL (most are between 13 and 18 mm; Fields 1962). In Florida, they move to shore from mid-April to mid-May (Fields 1962), or slightly earlier (Moe et al. 1968). The first spawning "wave" of larvae is followed, at about 1-month intervals, by subsequent waves that continue into late October or even as late as early December. According to Fields (1962), juveniles leave the

Georgia beaches for deeper water when they are 60 to 70 mm TL. Juveniles from the first spawning begin to leave about mid-July. In Florida, Iversen and Berry (1969) reported that juveniles reach 120 mm SL (150 mm TL) before leaving the beaches. In late fall, water temperature usually is the principal factor that determines the time of departure. By the time the water temperature has dropped below 19 °C, the juveniles have abandoned the beaches (Fields 1962). Along the south Georgia coast, spawning appears to be most intense in April and May when the larvae are most abundant.

Maturity and Life Span

The most useful information on the sexual development of the Florida pompano was reported by Moe et al. (1968), who examined the gonads of 16 pond-reared pompano in February and 2 in May. All fish in the February group were sexually immature. The largest (a female) was 244 mm SL and weighed 890 g. Two sexually mature males examined in May were 225 mm and 255 mm FL and 269 g and 469 g.

Neither age nor life span of the species has been studied, either in captivity or at sea, but Berry and Iversen (1967) estimated that most pompano live 3 or 4 years under natural conditions.

GROWTH CHARACTERISTICS

On the basis of data on pond-reared fish from St. Augustine, Florida, Moe et al. (1968) constructed a growth curve (Figure 4) from which they estimated that it would take a Florida pompano 18 months to reach 250 mm FL and weigh 0.45 kg; however, environmental conditions in the pond were less than optimal.

Florida pompano held from 28 June to 12 November at the Miami Seaquarium and fed a mixture of whole ground fish and commercial trout food increased in

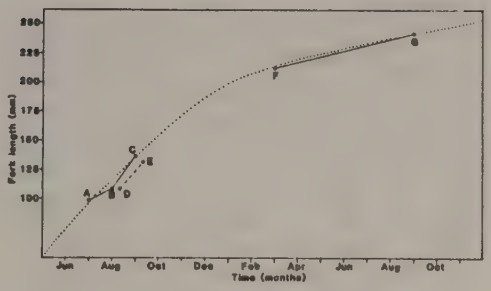


Figure 4. Growth curve based on empirical measurements of young pompano from June in their first year of life to October in their second year of life (Moe et al. 1968).

weight from 5 to 203 g and in length from 56 to 191 mm FL (Iversen and Berry 1969). This growth was more rapid than that reported by Moe et al. (1968) in ponds.

One striking feature noted by Iversen and Berry (1969) regarding the Miami Seaquarium experiment was the wide range of variation in growth among individuals. Although these fish were not of uniform size at the beginning of the experiment (range, 0.03-20 g and 14-99 mm FL), the ultimate degree of variation after 4.5 months was more than might have been expected (85-305 g and 139-240 mm SL).

On the basis of catch records from the Tampa Bay area, Finucane (1969a) estimated an average monthly growth rate of 22 mm for post-juveniles. Bellinger and Avault (1970) reported an average monthly growth rate for adults of about 36 mm (range 27 to 42 mm).

FISHERY

Quantity and Value of Commercial Fisheries

The Florida pompano is highly prized and commands the highest price per pound of any seafood from

southern waters of the United States. The following data provide comparisons of dockside prices from 1952 through 1981. Because of inflation during the 1970's and early 1980's, prices from 1952 through 1972, and 1973 through 1981 are given separately. Between 1952 and 1972, prices per pound ranged from $0.48 (in 1958) to $1.31 (in 1972); they averaged $1.06 in 1968-72 (Prochaska 1976). For 1973-81, prices per pound ranged from a low of $1.12 (in 1975) to a high of $2.72 (in 1981). Prices averaged $2.30 per pound (in 1977-81), and consistently remained above $2.00 after 1977 (Prochaska and Keithly, in press). Next to the Florida pompano, the species with the highest dockside prices were stone crab, oysters, and shrimp.

Between 1952 and 1981, the total weight of Florida pompano taken commercially in Florida ranged from a low of 455,000 lb, in 1955, to a high of 1,432,000 lb, in 1974 (values for 1970 to 1983 shown in Table 1). The low and high total dockside incomes from the sale of pompano in 1952-72 were $302,000 (in 1959) and $1,639,000 (in 1972); from 1973 to 1981 low and high dockside values were $1,484,000 (in 1973) and $2,150,000 (in 1981). Although the total number of pounds of pompano landed in 1952-72 was much lower than for most other commercial species (due in part to their comparatively small size), their total landed value was about equal to that of all groups except snapper, mullet, shrimp, and spiny lobster.

Commercial landings of pompano are reported in all Coastal States from Virginia to Texas, but Florida contributes more than 90% of the total. For example, in 1965 about 833,000 lb of the total U.S. catch of 886,000 lb were taken in Florida (Lyles 1967). In 1965, the Atlantic coast catch of pompano made up about 1% of the total weight of all finfish and shellfish caught, and more than 5% of the total dollar value. In Florida, pompano contributed about 0.4% of the weight and about 1.6% of the value (Berry and Iversen 1967).

Most pompano are caught along the west coast of Florida, from Monroe County (including the Florida Keys) to Charlotte County (vicinity of Fort Myers) (Figure 2). The largest catches on the east coast are made from Brevard County (Cape Canaveral) south to Palm Beach County. Most of the pompano caught commercially in Florida are from offshore waters, although some are caught in the estuaries of the Indian and Banana Rivers near Cape Canaveral.

Most adult pompano are caught commercially in large trammel nets, but some are caught with gill nets (Berry and Iversen 1967). Pound nets are the principal gear used in Chesapeake Bay (Hildebrand and Schroeder 1928). In the Florida Keys, airplane spotters help locate concentrations of pompano for fishermen, a practice that has helped increase catches in recent years.

Although a highly sought game fish, Florida pompano nevertheless comprise only a small percentage of the sport catch in coastal waters of the southeastern United States. The sport catch of pompano and permit is so small that these species are listed under "other fish" in marine sport fish statistics (National Marine Fisheries Service 1979). Most pompano are taken by anglers in the surf, off fishing piers, and over shallow flats. Pompano angling was discussed by Buckow (1965), who indicated that the pompano ranked second only to the bluefish (Pomatomus saltatrix) in importance as a surf sportfish in Florida.

## Value and Palatability of Florida Pompano

The permit is not valued as highly as the Florida pompano. Even though they are about equally

Table 1. Annual commercial landings (thousands of pounds) and value in parentheses (thousands of dollars) of Florida pompano from the Southeastern States and Texas, 1970-83.

| State | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Florida[a] (east coast) | 243,400 ($294) | 123,100 ($157) | 156,300 ($225) | 332,400 ($377) | 228,000 ($265) | 195,500 ($224) | 444,200 ($624) | | | | | | | |
| | | | | | | | | 1,359,617 ($2,070) | 881,006 ($1,789) | 731,131 ($1,910) | 752,603 ($2,044) | 827,283 ($2,150) | 880,042 ($2,180) | 762,144 ($2,130) |
| Florida[a] (west coast) | 851,600 ($964) | 831,900 ($1,053) | 1,098,500 ($1,414) | 919,000 ($1,107) | 1,204,700 ($1,537) | 1,132,700 ($1,266) | 947,900 ($1,267) | | | | | | | |
| Alabama | 2,100 ($818) | 5,200 ($3) | 4,505 ($2) | 13,277 ($7) | 13,671 ($7) | 9,503 ($5) | 13,991 ($7) | 6,374 ($3) | 9,665 ($5) | 10,207 ($8) | 9,798 ($11) | 3,311 ($2) | 5,109 ($10) | 1,403 ($1) |
| Georgia | 500 ($100) | --- | --- | --- | --- | --- | 110 ($1) | --- | --- | --- | 250 ($1) | 279 ($1) | 135 ($1) | 136 ($1) |
| Louisiana | 49,800 ($43) | 19,300 ($17) | 17,823 ($17) | 13,149 ($14) | 15,160 ($15) | 17,297 ($19) | 18,741 ($24) | 12,227 ($16) | 9,484 ($9) | 44,348 ($60) | 36,319 ($53) | 56,887 ($107) | 7,536 ($25) | 6,619 ($17) |
| Mississippi | --- | --- | 600 ( $1) | 710 ( $7) | 180 ( $1) | 26,820 ($34) | 1,910 ($2) | 3,810 ($4) | 2,410 ($5) | 26,350 ($65) | 47,400 ($128) | 50,790 ($135) | 10,500 ($28) | 2,530 ($7) |
| North Carolina | 4,000 ($1) | 2,500 ( $1) | 7,012 ($3) | 9,584 ($4) | 8,980 ($5) | 7,991 ($5) | 4,812 ($3) | 4,639 ($3) | 2,967 ($1) | 10,519 ($9) | 10,104 ($5) | 9,723 ($6) | 31,186 ($33) | 4,982 ($4) |
| South Carolina | 1,300 ( $1) | 700 ( $1) | 1,205 ( $1) | 4,992 ( $1) | 109 ( $1) | 1,249 ( $1) | --- | 111 ( $1) | 218 ($1) | 3,989 ($1) | 3,043 ($1) | 176 ($1) | 260 ($1) | 1,804 ($1) |
| Texas | 1,700 ( $1) | 3,400 ($2) | 5,000 ($2) | 1,800 ( $1) | 12,100 ($6) | 6,600 ($3) | 5,700 ($4) | 800 ( $1) | 1,000 ($1) | 3,600 ($5) | 1,200 ($1) | 400 ($1) | 3,840 ($4) | 4,500 ($2) |

[a]East and west coast landings combined in 1977-83.

abundant, the permit contributes less than 1% of the combined catch of the two species (Johnson 1978). Small permit (1-2 lb) are often sold as Florida pompano. A taste test was conducted by 13 panelists to compare the palatability of Florida pompano (both wild and cultured) with permit, palometa, and a more distantly related Brazilian carangid species, the parona (Parona signata). Pompano consistently received the highest ratings in flavor, texture, appearance, and aroma (Iversen and Berry 1969).

Mariculture Potential

Because of its consistently high value as a food fish, the Florida pompano has received considerable attention for its potential in mariculture (Berry and Iversen 1967; Moe et al. 1968; Iversen and Berry 1969; Finucane 1970b; Marcello and Strawn 1972). Juveniles, as stock for pond culture, are easily caught in large numbers with seines on open sandy beaches in many areas. Young pompano are so abundant along the Florida east coast that large numbers probably could be taken for commercial mariculture without endangering the spawning stocks or threatening the commercial fishery (Iversen and Berry 1969); however, the number that can be taken legally by seine in Florida waters is too small to economically support a mariculture operation. Thus far, artificial propagation on a large scale has failed.

Moe et al. (1968) published the most complete summary available of a pompano mariculture operation. It was based on work carried out by the Minorcan Seafood Company during the mid-1960's at facilities located on the inside of Matanzas Inlet, just north of Marineland, Florida. In the summary, it was concluded that the "Propagation of pompano and other fish in Florida waters has yet to become a consistently successful commercial venture. Although the success of such an endeavor appears technically and economically feasible, there are multitudinous problems that must be solved before a large scale commercial enterprise can be profitably conducted."

ECOLOGICAL ROLE

The food habits of juvenile pompano have been studied in coastal waters of Georgia (Fields 1962); Tampa Bay, Florida (Finucane 1969a); Florida (Armitage and Alevizon 1980); and Louisiana (Bellinger and Avault 1971). Bellinger and Avault (1971) summarized and compared results from the earlier reports; the following quotation is from their paper:

"Comparison of the food habits of Louisiana pompano with those reported from other areas showed basic similarities. Fields (1962) reported that juvenile pompano (13.5 to 80.5 mm SL) from Georgia ate amphipods, bivalve molluscs, crab larvae, copepods, isopods, and invertebrate eggs, in that order. He also found barnacles, polychaetes, cumacea, other invertebrates, and sand in the stomachs. Finucane (1969a) examined the food habits of pompano from Tampa Bay, Florida, reporting that pompano from 15 to 44 mm SL ate amphipods, larval and adult Diptera, and occasionally Donax variabilis. Pompano from 50 to 110 mm ate larger crustaceans and molluscs; those from 110 to 138 mm ate primarily Donax. Gunter (1959) reported that juvenile pompano, in Texas, fed to a large extent on young Harengula (Clupeidae). This was not the case in Louisiana and was not found by Finucane (1969a) in Florida. Larval or juvenile fishes occurred with very low frequency in the overall diet in Louisiana.

"Pompano can probably be considered selective grazers, feeding primarily along the bottom. . . . Large and well-developed pharyngeal plates indicate an eventual adult

specialization to feed on hardshell organisms such as clams or crabs. The stomach of the pompano is well defined and sac-shaped, often an indication of omnivorous food habits.

"Food habit data . . . indicate that juvenile pompano are opportunistic feeders in the smaller length classes, apparently feeding on those organisms that are most abundant or available at the time. As juvenile pompano grow larger, they appear to become more selective in their diet. Finucane (1969a) also noted this in Florida pompano."

Food habits of adult pompano have not been studied intensively. In the Aransas Bay area, Texas, two pompano (weighing about 4 lb each) contained 3 shrimp, 13 crabs, and 2 unidentified fish (Miles 1949). Nineteen adult pompano sampled from a commercial catch from Tampa Bay, Florida, in April and May 1968 fed exclusively on the scorched mussel, Brachidontes exustus, which attaches to rocks in the deeper parts of the bay. Adult pompano caught near oil rigs by sport fishermen in the Gulf of Mexico fed on penaeid shrimp (Finucane 1969a).

Nothing has been published to indicate that adults of any of the Trachinotus species comprise regular items of food for other fishes or higher vertebrates (excluding man). Many juveniles are undoubtedly eaten by larger fish. Birds that forage regularly along the beaches, particularly brown pelicans, may be the most serious predators.

Juvenile pompano are not heavily parasitized (Finucane 1969a). Of the two genera of isopods reported, Ione spp. were attached to the mouth and gill tissues, and Aegathoa spp. to various parts of the body and fins. Several parasitic brachyurans (Argulus sp.) were found on the skin, and mature and immature nematodes were sometimes found in the body cavity or encysted in the viscera. The nematode infection rate was higher in the permit. There is no evidence in the literature that diseases and parasites are a threat to the pompano in its natural habitat.

## ENVIRONMENTAL REQUIREMENTS

Information on environmental requirements (temperature, salinity, dissolved oxygen, carbon dioxide, and pH) of the Florida pompano appear in a number of publications (Gunter 1945; Springer and Woodburn 1960; Moe et al. 1968; Finucane 1969a).

### Temperature

Most pompano in the Tampa Bay area live in a water temperature range of 17 to 32 °C, but 28 to 32 °C is preferred. Generally, temperatures below 15 °C are unfavorable. Captive stocks of pompano subjected to temperatures from 10 to 15.6 °C suffered some mortality (Berry and Iversen 1967), but a few survived temperatures as low as 9.7 °C for short periods.

The results of laboratory experiments on the effects of decreasing water temperature on pompano were reported by Moe et al. (1968) and are illustrated in Figure 5. Most pompano first showed symptoms of stress when temperatures were reduced to about 12.2 °C, and all but one nearly died when water temperatures were lowered to about 10.8 °C. They concluded that the low critical temperature for pond-reared pompano is near 10 °C. The critical high temperature for adult pompano may be about 38 °C, although small juveniles have been observed in tide pools at temperatures near 46 °C.

### Salinity

Pompano rarely live in brackish waters. Based on catch records, adults apparently prefer a salinity

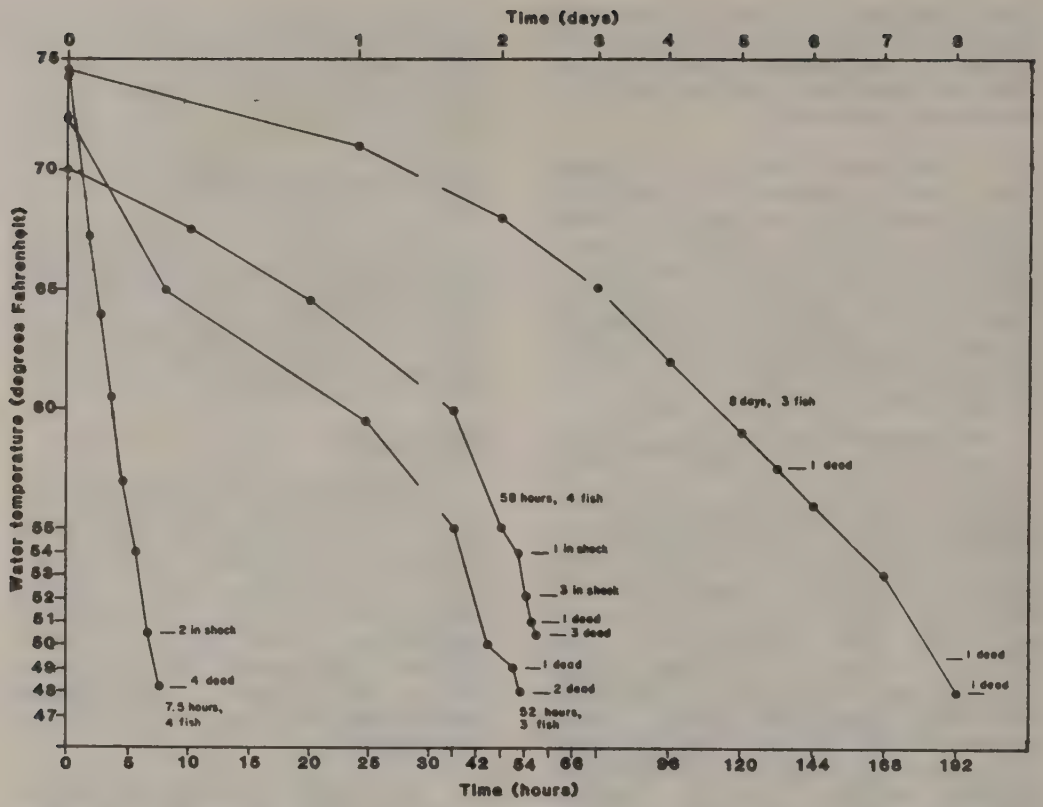


Figure 5. Incidence of shock and mortality of Florida pompano (175 to 225 mm long in Florida and in good condition) exposed to declines in water temperatures over different lengths of time. (Modified from Moe et al. 1968).

range of 28 to 37 ppt. Juveniles apparently tolerate a somewhat greater range of salinity, some having been observed in waters with salinities as low as 9 ppt (Gunter and Hall 1963) and as high as 50 ppt (Perret et al. 1971). Juveniles appear to tolerate a wider range of water temperature and salinity than do adults.

In a laboratory experiment in which Moe et al. (1968) transferred five pompano directly from seawater to freshwater, the fish went into a state of shock and died within 7.5 h. Four pompano taken from waters with a salinity of 29 ppt and placed in water with a salinity of 9 ppt showed no stress, and were maintained at 9 ppt for 16 days. The salinity was then gradually reduced over 3 days to 1.3 ppt without mortality. As a result of this experiment, Moe et al. (1968) concluded that pompano possibly could, under controlled conditions, adapt to freshwater. Whether they would feed or their eggs would develop normally in freshwater is unknown.

## Depth

The Florida pompano usually lives in shallow water (particularly the younger fish); there are few

indications in the literature of precise depths of capture. Sometimes, however, sexually ripe adults seek deeper water. Some pompano have been caught in water 60 m deep in the DeSoto Canyon area in the northern Gulf of Mexico (J.H. Finucane, pers. comm.; Shipp and Hopkins 1978). The collection of a larva near the surface of water over 100 fathoms deep (Fields 1962) suggests spawning in deeper water, but deep-water spawning has not been demonstrated.

Substrate

Florida pompano characteristically live near or over open low-energy beaches with sand or mud bottoms, or over shallow tidal mud flats. The type of bottom encountered in deeper water may vary, but it is not known if bottom characteristics are critical for spawning success or feeding.

Other Environmental Factors

Experiments on the effects of dissolved oxygen depletion, pH elevation, and extreme turbidity on pompano were conducted by Moe et al. (1968). Pompano were stressed in waters in which dissolved oxygen content dropped to 3 ppm, and died at concentrations of 2.5 ppm. There is ample evidence to suggest that this situation is more complex, however, and that a number of environmental and physiological factors may work in combination to determine lethal levels of oxygen deficiency. Moe et al. (1968) also found that pompano died when the pH dropped much below 4 or exceeded 12.

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16. Abstract (Limit: 200 words)

Species profiles are literature summaries of the morphology, range, life history, and environmental requirements of coastal aquatic species. They are designed to assist in environmental impact assessment. Florida pompano is a marine species that is especially common along the Florida coast. Florida pompano is an excellent food fish, so it supports an important commercial and recreational fishery. Larvae live in the open sea, but juveniles use waters along beaches as nursery grounds. Juvenile pompano eat planktonic but mostly benthic invertebrates. Adults feed on invertebrates and fish. Pompano prefer temperatures of 28-32 °C, and adults apparently prefer salinities of 28-37 ppt. Pompano died at a dissolved oxygen concentrations of 2.5 ppm.

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